1,2,3-Trichloropropane
Chemical Backgrounder

Description:
1,2,3-Trichloropropane (CAS# 96-18-4), or TCP, is a colorless liquid that is used primarily as a chemical intermediate in the production of polysulfone liquid polymers and dichloropropene, synthesis of hexafluoropropylene, and as a cross-linking agent in the synthesis of polysulfides. It has been used as a solvent, extractive agent, paint and varnish remover, and cleaning and degreasing agent. It is not a naturally occurring chemical.

Chemical properties:
1,2,3-Trichloropropane has a strong acrid odor similar to chloroform. It evaporates almost as fast as water at normal temperatures. It is soluble in alcohol, ether, and chloroform, and is slightly soluble in water. It dissolves oils, waxes, fats, chlorinated rubber, and numerous resins. It is sensitive to prolonged exposure to light and heat. It is incompatible or reactive with chemically active metals, strong caustics, and oxidizers. When heated to decomposition, it yields highly toxic fumes of carbon monoxide, carbon dioxide, hydrogen chloride gas, phosgene gas, and other chlorinated compounds. Synonyms for 1,2,3-trichloropropane are allyl trichloride, glycerol trichlorohydrin, glyceryl tricholorohydrin, and trichlorohydrin.

Identification:
* Chemical Name: 1,2,3-trichloropropane
* Regulatory Name: 1,2,3-trichloropropane
* Formula: C3H5Cl3
* DOT Label: KEEP AWAY FROM FOOD
* CAS: 96-18-4
* CHRIS: TCN
* UN Number: 2810

Health effects:
1,2,3-Trichloropropane is now listed, for the first time, in the Eighth Report on Carcinogens (1998) as a substance reasonably anticipated to be a human carcinogen. It is listed in the Toxic Release Inventory (TRI) as an Occupational Safety and Health Administration (OSHA) carcinogen. Exposure to it can cause central nervous system damage; liver damage; and eye, skin, and throat irritation. Members of the general population may be exposed to it by ingesting contaminated well water near a waste disposal site or agricultural lands treated with fumigants and nematocides that contain the compound as an impurity, or by inhaling contaminated air near manufacturing facilities or hazardous waste disposal facilities.

Exposure Values
* IDLH: Ca 100ppm
* TLV TWA: 100 ppm
* NIOSH REL: Ca 10ppm
* OSHA PEL: 8 hour Time Weighted Avg: 50 ppm

Economics:
U.S. manufacturers of 1,2,3-trichloropropane are Dow Chemical USA, Freeport, TX, and Shell Chemical Company, Deer Park, TX. It is also produced as a byproduct of

the production of other chlorinated compounds such as dichloropropene, propylene chlorohydrin, dichlorohydrin, glycerol, and epichlorohydrin.

Regulation:
Under section 313 of the emergency Planning and Community Right to Know Act of 1986, releases of more than one pound of 1,2,3-trichloropropane in to the air, water, and land must be reported annually and entered into the Toxic Release Inventory(TRI).

National Overview of 1998 Toxics Release Inventory
In 1998 8 facilities released 20,947 pounds of 1,2,3-trichloropropane. Of those releases 13,889 pounds were air emissions, and 300 pounds were surface water discharges. None was released by underground injection. None was released to land, and 6,758 pounds were transferred off-site for disposal. Total emissions for 1998 represented an increase from 1997 emissions, which totaled 13,421 pounds; 1996 emissions, which totaled 8,763 pounds; and from 1995 emissions, which totaled 12,681 pounds; no data is available on 1988 (baseline) emissions.

In 1998, 16,487,234 pounds of 1,2,3-trichloropropane waste were managed; 7,100,000 pounds were recycled on-site; none was recycled off-site; 870,000 pounds were used for energy recovery on-site; none was used for energy recovery off-site; 2,553,000 pounds were treated on-site; 5,949,995 pounds were treated off-site; and 14,239 pounds were released on-and off-site.

The 3 states in which the largest amounts of 1,2,3-trichloropropane were released in 1998 were Texas (13,281 pounds); Mississippi (523 pounds); and Louisiana (385 pounds).

The 7 facilities releasing the largest amounts of 1,2,3-trichloropropane in 1998 were Shell Chemical Company, Deer Park, TX (12,008 pounds); Dow Chemical Company, Freeport, TX (860 pounds); Morton International Inc., Moss Point, MS (523 pounds); Occidental Chemical Corp, Deer Park, TX (413 pounds); Shell Oil Company, Norco, LA (364 pounds); Dow Chemical Company, Plaquemine, LA (21 pounds); E.I Du Pont De Nemours & Co. Inc, La Porte, TX (0 pounds).

Notations:
The NIOSH recommended exposure limits (RELs) are time-weighted average (TWA) concentrations for up to a 10-hour workday during a 40-hour workweek. A short-term exposure limit (STEL) is designated by "ST" preceding the value; unless noted otherwise, the STEL is a 15-minute TWA exposure that should not be exceeded at any time during a workday. A ceiling REL is designated by "C" preceding the value. Any substance that NIOSH considers to be a potential occupational carcinogen is designated by the notation "Ca."

The OSHA permissible exposure limits (PEL) are found in Tables Z-1, Z-2, and Z-3 of the OSHA General Industry Air Contaminants Standard (29 CFR 1910.1000). Unless noted otherwise, PEL are TWA concentrations that must not be exceeded during any 8-hour workshift of a 40-hour workweek. A STEL is designated by "ST" preceding the value and is measured over a 15-minute period unless noted otherwise. OSHA ceiling concentrations (designated by "C" preceding the value) must not be exceeded during any part of the workday; if instantaneous monitoring is not feasible, the ceiling must be assessed as a 15-minute TWA exposure. In addition, there are a number of substances from Table Z-2 (e.g., beryllium, ethylene dibromide, etc.) that have PEL ceiling values that must not be exceeded

except for specified excursions. For example, a "5-minute maximum peak in any 2 hours" means that a 5-minute exposure above the ceiling value, but never above the maximum peak, is allowed in any 2 hours during an 8-hour workday.

==========

Information Sources:
* CAMEO(r), U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, www.epa.gov/ceppo.

* Chemical Manufacturers Association, 1300 Wilson Blvd., Arlington, VA 22209: (703) 741-5000 or Chemical Referral Library, (800) 262-8200.

* National Institute of Environmental Health Sciences, Clearinghouse on Environmental Health Effects, 100 Capitola Drive, #108, Durham, NC 27713; (800) 643-4794; fax (919) 361-9408.

* TOXNET, National Library of Medicine, National Institutes of Health; www.toxnet.nlm.nih.gov

* U.S. Environmental Protection Agency, 401 M St., SW, Washington, DC 20460; Right to Know Hotline (800) 535-0202.

* U.S. Department of Labor, Occupational Health and Safety Administration, Washington, DC, www.osha.gov

* OSHA PEL: Z-1 Table: www.osha-slc.gov/OshStd_data/1910_1000_TABLE_Z-1.html

* OSHA PEL: Z-2 Table: www.osha-slc.gov/OshStd_data/1910_1000_TABLE_Z-2.html